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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/790,138	03/02/2004	Byung-chcol Song	Q79455	3019
23373	7590	06/28/2007	EXAMINER	
SUGHRUE MION, PLLC			WERNER, DAVID N	
2100 PENNSYLVANIA AVENUE, N.W.				
SUITE 800			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)
	10/790,138	SONG ET AL.
	Examiner David N. Werner	Art Unit 2621

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-13 is/are pending in the application.
 - 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-13 is/are rejected.
- 7) Claim(s) _____ is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 02 March 2004 is/are: a) accepted or b) objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application
- 6) Other: _____.

DETAILED ACTION

1. This is the First Action on the Merits for US Patent Application 10/790,138.

Currently, claims 1-13 are pending.

Priority

2. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 101

3. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

4. Claim 13 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The statement in paragraph [59] of the specification that the invention "may be embodied in a general purpose computer by running a program from...carrier waves" places software claim 13 in non-statutory from, as carrier waves have been held as non-statutory. See *O'Reilly v. Morse*, 56 U.S. (15 How.) 62, 112-114 (1853).

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claim 11 is rejected under 35 U.S.C. 102(b) as being anticipated by US Patent 5,731,850 A (Maturi et al). Maturi et al. teaches a system for determining MPEG motion estimation. Figure 2 shows an embodiment of Maturi et al., and figure 6 shows an example search area in a frame. Odd rows 304, shown in white, correspond with a “top field”, and even rows 306, shown in black, correspond with a “bottom field”. Regarding claim 11, for macroblock 16 within search area 112, motion estimator 56 independently calculates 5 sets of SADs and Motion Vectors, including for the entire macroblock 16, an odd-odd field of odd rows of search area 112 and odd rows of macroblock 16, an even-even field of even rows of search area 112 and even rows of macroblock 16, an odd-even field of odd rows of search area 112 and even rows of macroblock 16, and an even-odd field of even rows of search area 112 and odd rows of macroblock 16 (column 11, line 30–column 12, line 3). In a bidirectional frame, these calculations are made for both the forward and backward direction for use by encoding decision block 66 (column 12, lines 39-56). Encoding decision block 66 corresponds with the MC mode determination unit of the present invention.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and

the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-3, 6-8, 12, and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Maturi et al in view of US Patent Application Publication 2002/0,168,008 A1 (Ishikawa), and in view of US Patent 5,878,166 A (Legall).
Regarding step (a) in claims 1 and 13 and the SAD receiving unit in claims 6 and 12, for a macroblock 16, motion estimator 56 keeps a motion vector and SAD for an entire macroblock (column 11, lines 41-44), the sum of the SADs for the odd-even field and the even-odd field (column 12, lines 16-19) and the sum of the SADs for the odd-odd field and the even-even field (column 12, lines 25-27). This is done for both forward and backward SADs for a B-frame (column 12, lines 39-44). Regarding step (b) in claims 1 and 13 and the minimum value judgment unit in claims 6 and 12, Motion Estimator 16 chooses the minimum of the SADs described above to be the SAD, and its corresponding motion vector to be the motion vector, for macroblock 16 (column 12, lines 30-33). Regarding step (c) in claims 1 and 3 and the first selection unit in claims 6 and 12, again, the motion vector for the block is chosen as the one corresponding with the smallest SAD.

Maturi et al. teaches a thresholding technique to determine whether to perform a hierarchical search or a full-block motion vector search (column 10, lines 31-67), but not to determine an encoding mode for a picture. Ishikawa teaches a moving picture coding system. Figure 1 illustrates an embodiment of the invention of Ishikawa. Regarding step (c) in claims 1 and 13 and the first selection unit in claims 6 and 12, selector 15 of Ishikawa determines the frame type for a picture to be encoded. Subtractor 16 receives

a predictive object block and the best-matched image, and outputs a predictive error signal. If the error is smaller than a threshold, the block is encoded with inter-frame coding. However, if the error is larger than a threshold, the selector changes the block to perform intra-frame coding (paragraph 0035). In Ishikawa, intermediate frames are motion compensated interframe bidirectionally according to a forward motion vector MV_P and a backward motion vector MV_R (paragraph 0044).

Maturi et al. discloses the claimed invention except for choosing an encoding mode according to a threshold. Ishikawa teaches that it was known to choose whether to perform interframe or intraframe encoding of a block depending on if the error between the block and the optimum predictive block is less than a threshold, as set forth in paragraph [0035]. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to determine a predicted block as the motion compensation for a given block only if the error is below a threshold in order to reduce the error in encoding a picture, since it would be expected that encoding a picture according to motion compensation with a large error value would result in an unacceptable degradation of an image.

Maturi et al. does not teach an interpolative motion compensation mode, and Ishikawa does not teach a choice between a field motion compensation mode and a frame motion compensation mode. Legall teaches an MPEG encoding method. Regarding step (d) in claims 1 and 13 and the second selection unit in claims 6 and 12, Legall teaches a B-frame coding method in which a macroblock may be encoded with intra coding, unidirectional forward encoding, unidirectional backward encoding, or

bidirectional interpolative encoding (column 2, lines 26-35). Further, a choice must be made between frame encoding and field encoding for each frame (column 3, lines 24-29). In Legall, for a macroblock in a B-frame, motion vectors are calculated for forward prediction, backward prediction, and interpolation (column 10, lines 54-62). The motion vector chosen is the closest match (column 10, lines 41-45). In other words, if a unidirectional motion vector results in a better prediction than an interpolated motion vector, it is preferred. After the motion vectors are chosen for in interlaced picture, the decision is made whether to encode the frame as a frame or as two separate fields (column 10, line 63–column 11, line 14).

Maturi et al. in combination with Ishikawa discloses the claimed invention except for choosing between an interpolative field encoding or interpolating frame encoding if a good unidirectional motion vector is unavailable. Legall teaches that it was known to perform a dynamic field/frame encoding decision in video coding. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate a field/frame decision into a video encoder as taught by Legall, since Legall states in column 3, lines 24-29 that such a modification would enable an encoder to adapt to an optimized encoding mode depending on the amount of movement in a video.

Regarding claims 2 and 7, in Maturi et al., if the minimum SAD value is from the forward entire macroblock, forward odd-odd field, forward even-even field, forward odd-even field, or forward even-odd field, the corresponding forward motion vector is chosen

(column 12, lines 39-58), and in Legall, a field or frame motion vector is chosen determined on which mode results in the best prediction (column 10, lines 31-50). Regarding claims 3 and 8, in Maturi et al. if the minimum SAD value is from the backward entire macroblock, backward odd-odd field, backward even-even field, backward odd-even field, or backward even-odd field, the corresponding backward motion vector is chosen, and in Legall, a field or frame motion vector is chosen determined on which mode results in the best prediction. Regarding claims 4, 5, 9, and 10, in Legall, the decision to encode in a frame mode or field mode is made according to the field activity of the frame and the sum of the field activity of the two fields. The frame activity and field activity is determined from a SAD calculation (column 8, lines 41-54). If the frame activity is less than the field activity, then a macroblock is encoded with frame encoding, but otherwise a macroblock is encoded with field encoding (column 11, lines 7-14).

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

- US Patent 5,193,004 A (Wang et al.)
- US Patent 5,621,481 A (Yasuda et al.)
- US Patent 5,796,434 A (Lempel)
- US Patent 5,828,423 A (Serizawa et al.)
- US Patent 5,923,375 A (Pau)

- US Patent 6,122,317 A (Hanami et al.)
- US Patent 6,192,079 B1 (Sharma et al.)
- US Patent 6,442,203 B1 (Demos)
- US Patent 6,442,204 B1 (Snook et al.)
- US Patent 6,597,737 B1 (Kondo et al.)
- US Patent 6,925,123 B2 (Subramaniyan et al.)
- US Patent Application Publication 2002/0036705 A1 (Lee et al.)
- US Patent Application Publication 2002/0176500 A1 (Bakhmutsky et al.)
- US Patent Application Publication 2003/0099294 A1 (Wang et al.)
- US Patent Application Publication 2003/0123547 A1 (Song)
- US Patent Application Publication 2003/0142748 A1 (Tourapis et al.)
- International Application WO 00/38423 A1 (Hazra et al.)
- Field-Rate Conversion by Motion Estimation/Compensation (Pele et al.)
- Generation of Motion Vector Fields for Motion Compensated Interpolation of HDTV Signals (Götze)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David N. Werner whose telephone number is (571) 272-9662. The examiner can normally be reached on Monday-Friday from 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571) 272-7418. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

DNW

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